

IN THE CLAIMS:

Please amend the claims as follows:

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1. (original) A volumetric three dimensional display device with an interactive pointer, the device comprising:
- a rotating helical display screen that sweeps out a cylindrical three-dimensional display space;
- a projector for projecting two-dimensional slices of a three-dimensional data set on said rotating helical display screen so as to generate a three-dimensional volumetric display on said rotating helical display screen; and
- a laser pointer generating a pulsed laser beam.
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2. (original) The display device of Claim 1, wherein said pulsed laser beam is pulsed at a period matching a rotational period of said rotating helical display screen so that said laser beam, if said pointer is maintained in a constant orientation relative to said rotating helical display screen, strikes said rotating helical display screen at a single spatial point in said cylindrical three-dimensional display space each rotation of said rotating helical display screen.
3. (original) The display device of Claim 1, wherein said laser pointer further comprises a phase control device for controlling a phase of said pulsed laser beam such that said pulsed laser beam strikes said rotating screen at different points in said three-dimensional display space as said phase is changed.

4. (original) The display device of Claim 1, wherein said projector comprises a spatial light modulator.
5. (original) The display device of Claim 1, wherein said laser pointer further comprises an orientation sensor and said laser pointer wireless transmits a signal indicating said pointer's orientation relative to said three-dimensional display space.
6. (original) The display device of Claim 5, wherein said display device further comprises a wireless receiver for receiving said signal indicating said pointer's orientation relative to said three-dimensional display space, wherein said received signal is provided to a central processor of said display device and said three-dimensional volumetric display is modified to indicate that section of said three-dimensional display space at which said pulsed laser beam strikes said rotating helical display screen.
7. (original) A volumetric three-dimensional display device comprising:
- a rotating helical display screen that sweeps out a cylindrical three-dimensional display space;
 - a first projector for projecting two-dimensional slices of a three-dimensional data set on said rotating helical screen so as to generate a three-dimensional volumetric display on said screen;
 - a second projector for projecting a two-dimensional image that is superimposed on said three-dimensional volumetric display; and

a slotted plate in a projection path of said second projector, wherein said slotted plate rotates in synchronization with said rotating helical display screen.

8. (original) The device of Claim 7, wherein a portion of said two-dimensional image passing through at least one slot of said slotted plate is reflected by a mirror onto said rotating helical display screen, and wherein said first projector projecting said two-dimensional slices of said three-dimensional data set through an aperture in said mirror.

9. (original) The device of Claim 7, wherein a portion of said two-dimensional image passing through at least one slot of said slotted plate is reflected by a beamsplitter onto said rotating helical display screen, and wherein said first projector projecting said two-dimensional slices of said three-dimensional data set through said beamsplitter.

10. (original) A method of providing a volumetric three dimensional display device with an interactive pointer, the method comprising the steps of:

rotating a helical display screen that sweeps out a cylindrical three-dimensional display space;

projecting two-dimensional slices of a three-dimensional data set on said rotating helical display screen so as to generate a three-dimensional volumetric display on said rotating helical display screen; and

generating a pulsed laser beam on a laser pointer.

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11. (original) The method of Claim 10, further comprising the step of matching a period in which said laser beam is pulsed with a rotational period of said rotating helical display screen so that said laser beam, if said pointer is maintained in a constant orientation relative to said rotating helical display screen, strikes said rotating helical display screen at a single spatial point in said cylindrical three-dimensional display space each rotation of said rotating helical display screen.

12. (original) The method of Claim 10, further comprising the step of controlling a phase of said pulsed laser beam such that said pulsed laser beam strikes said rotating screen at different points in said three-dimensional display space as said phase is changed.

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13. (original) The method of Claim 10, further comprising the step of transmitting a signal indicating said pointer's orientation relative to said three-dimensional display space.

14. (original) The method of Claim 13, further comprising the step of receiving said signal indicating said pointer's orientation relative to said three-dimensional display space, wherein said received signal is provided to a central processor of said display device and said three-dimensional volumetric display is modified to indicate that section of said three-dimensional display space at which said pulsed laser beam strikes said rotating helical display screen.

15. (allowed) A method of providing a volumetric three-dimensional display device, comprising the steps of:

rotating a helical display screen that sweeps out a cylindrical three-dimensional display space;

projecting two-dimensional slices of a three-dimensional data set on said rotating helical screen so as to generate a three-dimensional volumetric display on said screen;

projecting a two-dimensional image that is superimposed on said three-dimensional volumetric display; and

rotating a slotted plate in a projection path of said two-dimensional image, wherein said slotted plate rotates in synchronization with said rotating helical display screen.

16. (allowed) The method of Claim 15, wherein a portion of said two-dimensional image passing through at least one slot of said slotted plate is reflected by a mirror onto said rotating helical display screen, and wherein said two-dimensional slices of said three-dimensional data set passes through an aperture in said mirror.

17. (allowed) The method of Claim 15, wherein a portion of said two-dimensional image passing through at least one slot of said slotted plate is reflected by a beamsplitter onto said rotating helical display screen, and wherein said first projector projecting said two-dimensional slices of said three-dimensional data set through said beamsplitter.

18. (new) A method of providing a volumetric three-dimensional display device, comprising the steps of:

rotating a helical display screen that sweeps out a cylindrical three-dimensional display space;

projecting two-dimensional slices of a three-dimensional data set on said rotating helical screen so as to generate a three-dimensional volumetric display on said screen;

selectively projecting a two-dimensional image that is superimposed on said three-dimensional volumetric display, wherein said selective projection of said two-dimensional image is synchronized with rotation of said rotating helical display screen.

19. (new) The method of Claim 18, further comprising performing said selective projection of said two-dimensional image by rotating a slotted plate in between a projector of said two-dimensional image and said display screen, wherein said slotted plate is rotated in synchronization with rotation of said rotating helical display screen

20. (new) The method of Claim 19, wherein a portion of said two-dimensional image passing through at least one slot of said slotted plate is reflected by a mirror onto said rotating helical display screen, and wherein said two-dimensional slices of said three-dimensional data set passes through an aperture in said mirror.

21. (new) The method of Claim 19, wherein a portion of said two-dimensional image passing through at least one slot of said slotted plate is reflected by a beamsplitter onto said rotating helical display screen, and wherein said first projector projecting said two-dimensional slices of said three-dimensional data set through said beamsplitter.

22. (new) A volumetric three dimensional display device with an interactive pointer, the device comprising:

a rotating helical display screen that sweeps out a cylindrical three-dimensional display space;

a projector for projecting two-dimensional slices of a three-dimensional data set on said rotating helical display screen so as to generate a three-dimensional volumetric display on said rotating helical display screen; and

a hand-held laser pointer generating a pulsed laser beam which a user directs at said rotating display screen to selectively indicate a point on the three-dimensional volumetric display.

23. (new) The display device of Claim 22, wherein said pulsed laser beam is pulsed at a period matching a rotational period of said rotating helical display screen so that said laser beam, if said pointer is maintained in a constant orientation relative to said rotating helical display screen, strikes said rotating helical display screen at a single spatial point in said cylindrical three-dimensional display space each rotation of said rotating helical display screen.

24. (new) The display device of Claim 22, wherein said laser pointer further comprises a phase control device for controlling a phase of said pulsed laser beam such that said pulsed laser beam strikes said rotating screen at different points in said three-dimensional display space as said phase is changed.

25. (new) The display device of Claim 22, wherein said projector comprises a spatial light modulator.

26. (new) The display device of Claim 22, wherein said laser pointer further comprises an orientation sensor and said laser pointer wireless transmits a signal indicating said pointer's orientation relative to said three-dimensional display space.

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27. (new) The display device of Claim 26, wherein said display device further comprises a wireless receiver for receiving said signal indicating said pointer's orientation relative to said three-dimensional display space, wherein said received signal is provided to a central processor of said display device and said three-dimensional volumetric display is modified to indicate that section of said three-dimensional display space at which said pulsed laser beam strikes said rotating helical display screen.
